

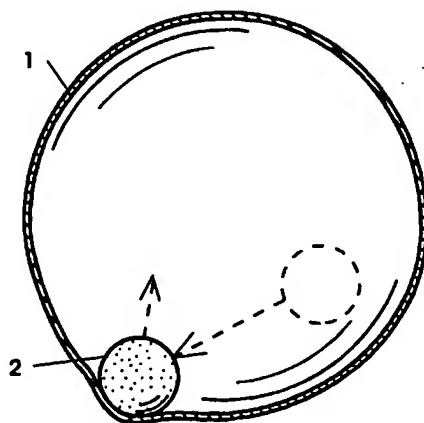
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(54) **BALLE DE JEU**

(54) **AMUSEMENT BALL**



(57) Balle d'amusement comprenant un élément extérieur construit d'un matériau élastique léger et d'un élément intérieur placé dans une position mobile à l'intérieur de la balle extérieure. Dans un des modèles, le dispositif comprend une surface irrégulière définissant de nombreux points de contact avec la surface intérieure de la balle extérieure et émettant un son s'il est déplacé à l'intérieur. Dans un autre modèle, le dispositif est allongé et peut être accompagné d'une poignée.

(57) An amusement ball comprising an outer ball member made of a light elastic resilient material and an inner member positioned in free-moving relationship within the outer ball. In one embodiment the device comprises an irregular surface defining a plurality of points for making contact with and inner surface of the outer ball and producing sound when moved relative thereto. In another embodiment the device is elongated, and can be provided with a handle

ABSTRACT OF THE DISCLOSURE

An amusement ball comprising an outer ball member made of a light elastic resilient material and an inner member positioned in free-moving relationship within the outer ball. In one embodiment the device comprises an irregular surface defining a plurality of points for making contact with and inner surface of the outer ball and producing sound when moved relative thereto. In another embodiment the device is elongated, and can be provided with a handle.

TITLE**Amusement Ball****FIELD OF THE INVENTION**

5 This invention relates to an amusement ball, and particularly to a ball that provides erratic motion. In one embodiment of the invention the ball also emits sounds.

BACKGROUND OF THE INVENTION

10 Various types of balls are known including some which provide erratic motion. An example of this is U.S. Patent No. 3,995,855 to Schultz. Also known are balls which emit sounds. An example of a sound emitting ball is disclosed in U.S. Patent to Shishido.

15 It would be desirable to provide a ball with a highly lively erratic behaviour, and also one which can emit sounds.

SUMMARY OF THE INVENTION

 An object of the present invention to provide a ball with lively erratic behavior when bounced or thrown.

20 A further object of one embodiment of the invention is to provide a ball that emits sounds.

 The present invention provides an amusement ball comprising an outer ball member made of an elastic resilient material and an inner member positioned in free-moving relationship within the outer ball.

25 In one embodiment of the invention the device comprises an irregular surface defining a plurality of points for making contact with an inner surface of the outer ball and producing sound when moved relative thereto.

In another embodiment the outer ball is elongated, and may be provided with a handle.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view of one embodiment of the invention.

Fig. 2 is a cross-sectional view illustrating another embodiment of the invention.

Fig. 3 is a side view of another embodiment of the invention.

Fig. 4 is an enlarged view showing details of the handle used in Fig. 3.

Fig. 5 is an end view of the handle shown in Fig. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to Fig. 1, which illustrates one embodiment of the invention, the ball comprises a generally spherical outer ball member 1 made of a elastic resilient material and an inner member 2, shown in the form of a ball, positioned in free-moving relationship within the surrounding outer ball.

For use, the elastic material of the outer ball must be taut or stretched, which can be conveniently done by pressurizing with air or other gas. It will be appreciated that the ball may be provided in deflated form and provided with means allowing inflation by the user.

The material for the outer ball is selected to provide elastic deformation or stretching when struck by the inner member.

To achieve the desired lively erratic effect, the mass of the outer ball should be small relative to the mass of the inner member or members, such that motion of the inner member striking the inner surface of the outer ball produces a relatively large reaction and motion of the outer ball. The outer ball will change direction each time the inner member rebounds from the wall producing the erratic motion of the outer ball.

When the outer ball 1 strikes an obstacle, or is otherwise accelerated or decelerated abruptly, the inner member 2 will bounce against the inner wall of the outer ball. Upon contact, the moving inner member will stretch the elastic material of the outer ball and rebound off the wall, similar to the bouncing action of a trampoline. Typically the inner member 2 will bounce off the wall of the outer ball repeatedly, altering the path of the outer ball with each bounce and thereby providing erratic motion.

As discussed above, the erratic deviations in motion will be large when the mass of the outer ball is small relative to the mass of the inner member. For a lively erratic effect the mass of the outer ball should be less than $1/4$, and preferably less than $1/6$ of the mass of the inner member.

Also, for a lively erratic effect the outer ball must be very elastic, with high elastic deformation or stretching when struck by the inner ball. Upon striking the wall, the kinetic energy of inner ball is converted to potential energy as it stretches the outer ball wall and is then converted again to kinetic energy to the ball for travel in a new direction, with little absorption or loss of energy.

It appears that the desired lively motion is obtained when the outer ball material is selected to provide deformation of the wall that is greater than $1/100$ of the diameter of the outer ball when struck by the inner member. The desired elastic deformation for the outer ball can be conveniently obtained with a thin walled material such as used for balloons.

Lively erratic motion has been achieved where the outer ball was a balloon having a diameter of approximately 40 cm, and the inner ball was a "supper ball" type of hard rubber ball 2.5 cm to 4 cm in diameter. It was found that non-elastic vinyl beach balls, used as the outer ball, did not produce the desired lively erratic motion. The absence of the desired motion in such balls is due to the non-elastic properties of the vinyl wall of the such ball.

The inner ball 2 can be made to roll around the inside of the outer ball by performing a rapid orbiting motion of the outer ball. If the outer ball is released or thrown while the inner ball 2 is moving within, it will result in an erratic motion of the outer ball.

5 It may be desirable to be able to kick the ball which would more likely subject it to contacting sharp objects and tend to puncture a balloon-like outer ball which is highly stretched. It has been found that by adding another larger light balloon-like layer on the outside the main outer ball provides protection reducing the likelihood of rupture. Such a configuration comprises the required
10 highly stretched ball component which provides a good rebounding surface for the inner member 2, while the surrounding outer ball component provides a low parasitic weight stress reducer. This outer protective layer need not be subjected to the high pressurized stressed condition and hence is less likely to be ruptured.

15 Alternatively, the outer ball may be made of a single layer puncture resistant material. A thick material is desired for durability, but a thicker wall tends to result in higher mass, which is undesirable. One suitable thick material is now used in some regular balls, which consists of an elastic foamed material with elastomer, such as foamed polyvinyl chloride. This material has the desired elastic properties, is light in weight and the entrained air bubbles act as stress reducers
20 making the ball suitable for outdoor use.

Fig. 2 illustrates another embodiment of the invention, which shows two inner members 12 and 13.

25 In Fig. 2 the inner members are in the form of polygons, defining a number of surfaces and edges. When the inner members roll along the inner wall of the outer ball or otherwise strike the outer ball they produce sound. The inner members produce vibrations in the outer ball wall when they roll and edges strike the wall, similar to the beating of a drum, thereby producing a relatively loud sound emission.

It has been found that two cubes the size of die produce sounds similar to elephant trumpeting when they roll inside the outer ball. With a single cube, with faces approximately 3 cm in length, a roaring or growling sound was produced.

5 It will be appreciated that the number, shape, size, mass and number of inner members can be varied for producing different kinds of entertaining sound and motion effects.

10 In another embodiment the outer ball is elongated, for example, a balloon in the shape of a baton. Similar to embodiments described above, such a device can be provided with inner members that provide unusual motion and/or sounds when the baton is swung.

15 With reference to Fig. 3, 4, and 5, a handle 30 may be provided at one end of a baton shaped balloon 31 to facilitate handling. The handle 30 has a hollow concave portion 34 to receive one end of the balloon reducing bending so that the the balloon can be used as a baton or toy sword. A narrow slot 32 in the handle holds a knotted end 33 of the balloon. A depression or recess 35 in the end facilitates retention of the knot. Alternatively, the balloon may be retained in the handle by means of a plug placed in the open end of the balloon. Additionally, an air pump for inflating a balloon may be incorporated into the handle.

What is Claimed is:

1. An amusement ball comprising an outer ball member made of an elastic resilient material and an inner member positioned in free-moving relationship within the outer ball.
2. The device of Claim 1 wherein the mass of the outer ball is small relative to that of the inner member.
3. The device of Claim 1 wherein the mass of the outer ball is less than $1/4$ of the mass of the inner member.
4. The device of Claim 1 wherein the mass of the outer ball is less than $1/6$ of the mass of the inner member.
5. The device of Claim 1, further having means for pressurizing the outer ball to provide a taut rebounding wall surface for the inner member.
6. The device of Claim 1 wherein, for use, the outer ball is pressurized to provide a taut rebounding wall surface for the inner member.
7. The device of Claim 1 wherein the outer ball material is selected to provide deformation of the wall that is greater than $1/100$ of the diameter of the outer ball when struck by the inner member.
8. The device of Claim 1 comprising a plurality of inner members.

9. The device of Claim 1 wherein the inner member comprises an irregular surface defining a plurality of points for making contact with and inner surface of the outer ball and producing sound when moved relative thereto.
10. The device of Claim 1 wherein the outer ball comprises a plurality of layers, with an inner layer being in a pressurized stretched condition and other surrounding layers being in a relatively unstretched condition.
11. The device of Claim 1 wherein the outer ball is elongated.
12. The device of Claim 11 further comprising a handle having a hollow portion to receive one end of the outer ball.
13. The device of Claim 12 wherein the handle includes a slot to hold a knotted end of the outer ball for retention of the outer ball within the handle.

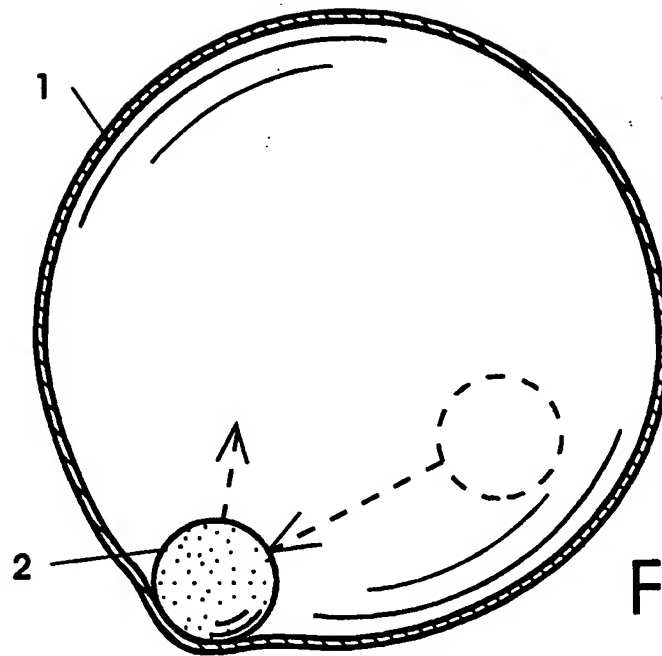


Fig. 1

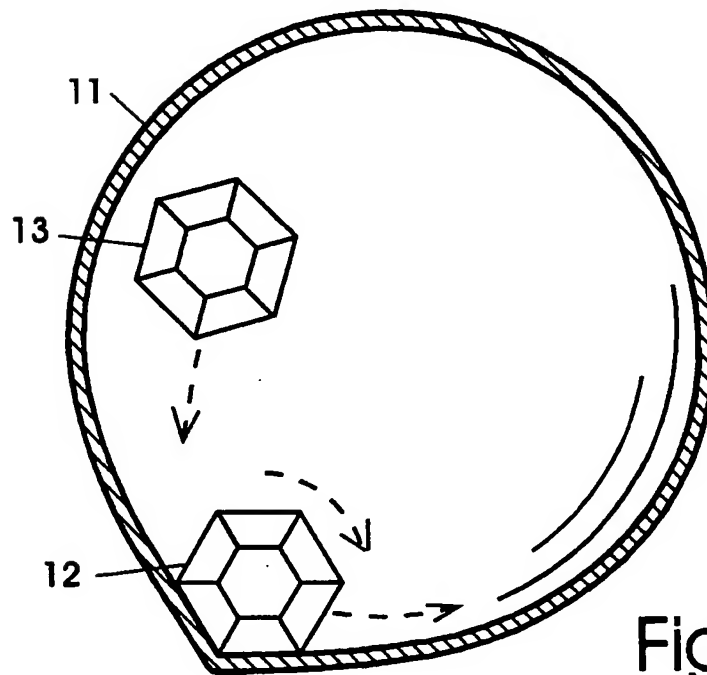


Fig. 2

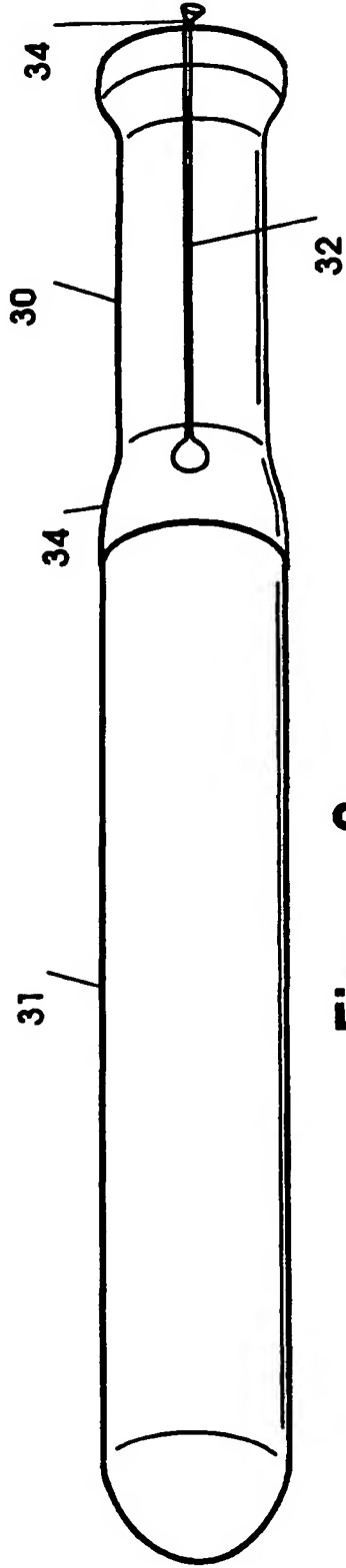


Fig. 3

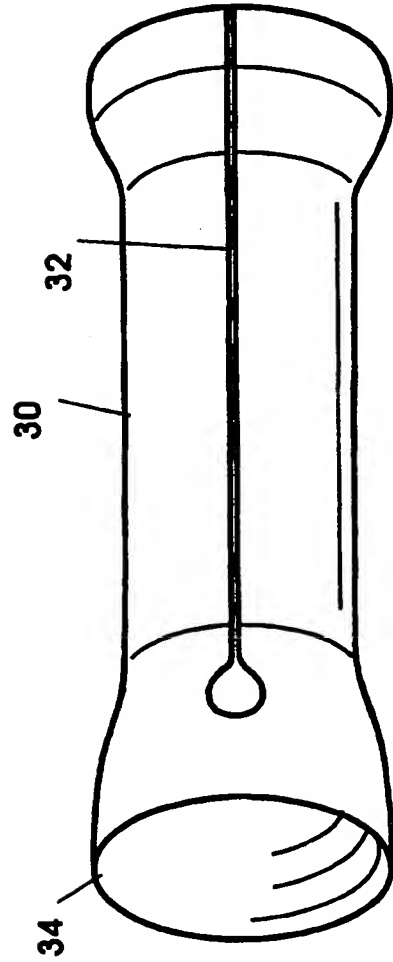


Fig. 4

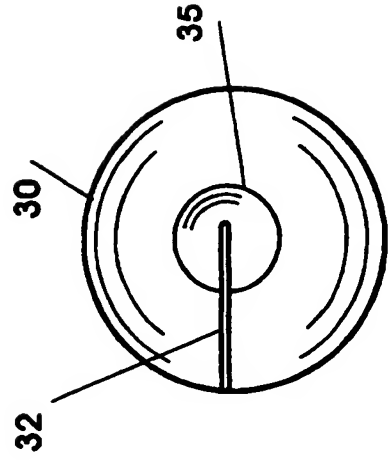


Fig. 5